

WHAT IS CLAIMED IS:

1. A dispersion compensator for compensating for a wavelength dispersion of a transmission medium lying in an optical pulse transmission path, comprising:

at least one dispersion compensating waveguide formed by a photonic crystal in which ununiform elements are introduced into periodic structures of at least two or more types of mediums different in refractive index;

whereby a dispersion property of light that propagates through the ununiform elements of the photonic crystal, is used to compensate for the waveform dispersion.

2. The dispersion compensator according to claim 1, wherein the ununiform elements of the photonic crystal and the periodic structures lying therearound form coupled microcavities, and the microcavities are used to compensate for the wavelength dispersion.

3. The dispersion compensator according to claim 1, wherein the length of an occupied waveguide portion of the photonic crystal in the dispersion compensating waveguide is changed to thereby compensate for the wavelength dispersion.

4. The dispersion compensator according to claim 1, wherein a lattice constant of the photonic crystal in the dispersion compensating waveguide is changed to thereby

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7. The dispersion compensator according to claim 5, wherein the coupled microcavities are formed by each of photonic crystals in which ununiform elements are respectively introduced in periodic structures of at least two types of mediums different in refractive index.

9. The dispersion compensator according to claim 7, wherein lattice constants of the photonic crystals in the respective dispersion compensating waveguides are rendered different to thereby control values for compensating for the wavelength dispersions.

10. An optical transmission system comprising:
a dispersion compensator defined in claim 1,
wherein the dispersion compensator is used to
compensate for wavelength dispersions in an optical
transmission path every wavelengths.